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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,877	11/24/2003	David W. Sickenberger	DAM 587-02	7474
24211	7590	03/08/2005	EXAMINER	
US ARMY SOLDIER AND BIOLOGICAL CHEMICAL COMMAND OFFICE OF THE CHIEF COUNSEL/IP TEAM (BLDG E4435) 5183 BLACKHAWK ROAD APG, MD 21010-5424			TANINGCO, MARCUS H	
			ART UNIT	PAPER NUMBER
			2878	

DATE MAILED: 03/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/720,877	SICKENBERGER ET AL.
	Examiner	Art Unit
	Marcus H. Taningco	2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on ____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) Claim(s) ____ is/are allowed.
- 6) Claim(s) 1-8, 11-21 and 23-25 is/are rejected.
- 7) Claim(s) 9, 10, 22 and 26-28 is/are objected to.
- 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 24 November 2003 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All
 - b) Some *
 - c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. ____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: ____.

DETAILED ACTION

Claim Objections

1. Claim 9 is objected to because of the following informalities: The term “couplable” is undefined and therefore renders the claim indefinite. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7, 11-17, 19-21, and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yufa (US 5,946,091) and Pentoney, Jr. et al. (US 5,675,155), hereafter Pentoney, in view of Price (US 6,120,166).

Re claim 1, Yufa discloses a device for precise counting and measuring particles comprising: a mirror system 4 comprising ellipsoid mirrors that define a focal point 8 within the interior of the mirror system 4 (Fig. 5); a pair of opposing first tubes 10, 13 passing through the mirror system 4 and directed at the focal point 8 for directing particles to the focal point 8 (Fig. 5); and a light source 2 directed at a focal point 8 (Col. 7, 26-43). Yufa fails, however, to specify the use of spherical mirrors. Price discloses a light source apparatus for a spectral analyzer comprising an ellipsoidal-spherical mirror combination of mirrors to control the location of the

focal point (Fig. 1). Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify Yufa with a spherical mirror in order to accurately analyze complex multi-component mixtures. Furthermore, although Yufa fails to teach generating fluorescence, Pentoney teaches that particles detection systems can apply UV and visible light to detect particles. Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify the combination taught by Yufa and Price to use an electromagnetic radiation source **12** directed at a sample to generate fluorescence in order to improve system reliability and detection sensitivity.

Re claim 2, Yufa discloses the claimed invention except for specifying an ultraviolet light source. However, it would have been an obvious matter of design choice to use an ultraviolet light source since it was known in the art that the type of light source used depends upon the materials being analyzed and the components thereof. Those skilled in the art recognize that different fluorescent labels require different excitation energies or excitation wavelengths in order to obtain the desired emission properties as taught by Pentoney (Col. 5, 49-58).

Re claim 3, Yufa further discloses another pair of opposing tubes **24, 27** passing through the mirror system **4** and directed at the focal point **8** (Fig. 6).

Re claim 4, Yufa discloses a method and apparatus for counting and measuring particles but fails to specify for a photon counter. Yufa further discloses detecting fluorescence from within the mirror system **4** without specifying the detection means. However, in the art of fluorescence spectroscopy, it is well known and conventional that photon counting (PMT's) is used to extract the maximum information from the sample being analyzed. Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to

modify Yufa to include a photon counter in order to provide authenticity of the real quantity and size or particles in the assayed mixture of air or liquid.

Re claim 5, Yufa discloses the claimed invention according to claim 4 further comprising filters **40, 41, and 42** (Fig. 9).

Re claim 6, Yufa discloses the claimed invention but fails to specify a spherical mirror with a plurality of radial notches. Price teaches a segmented spherical mirror **8** (Fig. 2). It would have been obvious to one with ordinary skill in the art at the time the invention was made to modify Yufa with Price in order to prevent distortion of the focal point.

Re claim 7, Yufa teaches a light source **2** located exteriorly of the mirror system **4** (Fig. 5).

Re claim 11, Yufa teaches respective tubes are located substantially equidistant from the focal point **8** (Fig. 6).

Re claim 12, Yufa teaches inside diameters of the respective tubes are substantially equal (Fig. 6).

Re claim 13, Yufa further teaches each pair of first tubes **24, 27** passes concentrically through a respective one pair of second tubes **26, 29** to form a flow passage between an exterior of each first tube and an interior of the mirror system **4** (Fig. 6).

Re claim 14, Yufa discloses a device for precise counting and measuring particles comprising: a mirror system **4** comprising ellipsoid mirrors that define a focal point **8** within the interior of the mirror system **4** (Fig. 5); a pair of opposing first tubes **10, 13** passing through the mirror system **4** and directed at the focal point **8** for directing particles to the focal point **8** (Fig. 5); and a light source **2** directed at the focal point for directing light at the particles (Fig. 5).

Yufa further discloses detecting fluorescence from within the mirror system 4 without specifying the detection means. However, in the art of fluorescence spectroscopy, it is well known and conventional that photon counting (PMT's) is used to extract the maximum information from the sample being analyzed. Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify Yufa to include a photon counter in order to provide authenticity of the real quantity and size or particles in the assayed mixture of air or liquid. Yufa also discloses filters 40, 41, and 42 (Fig. 9). Yufa fails, however, to specify a spherical mirror disposed so as to abut the ellipsoid mirror. Price discloses a light source apparatus for a spectral analyzer comprising an ellipsoidal-spherical mirror combination of mirrors to control the location of the focal point (Fig. 1) wherein the spherical mirror 4 abuts the ellipsoidal mirror 2. Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify Yufa with a spherical mirror in order to accurately analyze complex multi-component mixtures. Furthermore, although Yufa fails to teach end caps, Price discloses end caps 7 in Fig. 1. It would have been obvious to one with ordinary skill in the art at the time the invention was made to modify Yufa to include the end caps taught by Price in order to provide a protective housing for the particle detecting apparatus. Furthermore, although Yufa fails to teach generating fluorescence, Pentoney teaches that particles detection systems can apply UV and visible light to detect particles. Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify the combination taught by Yufa and Price to use an electromagnetic radiation source 12 directed at a sample to generate fluorescence in order to improve system reliability and detection sensitivity.

Re claim 15, Yufa teaches a light source may be a laser beam (Col. 4, 42-45).

Re claim 16, Yufa further discloses the claimed invention according to claim 14 further comprising another pair of opposing tubes **24, 27** passing through the mirror system **4** and directed at the focal point **8** (Fig. 6).

Re claim 17, Yufa discloses the claimed invention according to claim 14 further comprising a light source **2** located exteriorly of the mirror system **4** (Fig. 5).

Re claim 20, Yufa teaches a method comprising the steps of: directing a pair of opposing particle flows at a focal point **8** within an ellipsoidal cavity having an ellipsoidal mirror; directing light at the focal point **8** to illuminate the particles at the focal point **8** to generate scattered light from the particles; and directing the scattered generated at the focal point **8** to a second focal point of the particle detecting system (Col. 4, 1-32). Yufa fails, however, to specify the use of spherical mirrors. Price discloses an ellipsoidal-spherical mirror combination of mirrors to control the location of the focal point (Fig. 1). Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify Yufa with a spherical mirror in order to accurately analyze complex multi-component mixtures. Although Yufa fails to specify an ultraviolet light source, it would have been an obvious matter of design choice to use an ultraviolet light source since it was known in the art that the type of light source used depends upon the materials being analyzed and the components thereof. Furthermore, although Yufa fails to teach generating fluorescence, Pentoney teaches that particles detection systems can apply UV and visible light to detect particles. Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify the

combination taught by Yufa and Price to use an electromagnetic radiation source **12** directed at a sample to generate fluorescence in order to improve system reliability and detection sensitivity.

Re claim 21, Yufa teaches a method, wherein directing scattered light generated at the focal point **8** to the second focal point (Col. 4, 1-32) comprises reflecting any scattered light received at the ellipsoid mirror **4** off of the ellipsoid mirror **4** and onto the second focal point (Col. 7, 26-44). Furthermore, although Yufa fails to teach generating fluorescence, Pentoney teaches that particles detection systems can apply UV and visible light to detect particles. Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify the combination taught by Yufa and Price to use an electromagnetic radiation source **12** directed at a sample to generate fluorescence in order to improve system reliability and detection sensitivity.

Re claim 23, Yufa further discloses another pair of opposing tubes **24**, **27** directed at the focal point **8** (Fig. 6).

Re claim 24, Yufa teaches a light source **2** located exteriorly of the mirror system **4** (Fig. 5).

Re claim 25, Yufa discloses the claimed invention but fails to specify a spherical mirror with a plurality of radial notches. Price teaches a segmented spherical mirror **8** (Fig. 2). It would have been obvious to one with ordinary skill in the art at the time the invention was made to modify Yufa with Price in order to prevent distortion of the focal point.

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3. Claims 8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu, Pentoney, and Price as applied to claim 1 above, and further in view of Hogg et al. (US 4,286,876).

Re claim 8, Yu discloses the claimed invention but fails to specify a light dump. Hogg et al. discloses a light dump, which is well known in the art of particle detection by measuring scattered light, to prevent light from the light source from being reflected back into the sensing zone (Col. 6, 25-29). Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify the combination taught by Yu, Pentoney, and Price to include the light dump taught by Hogg et al. in order to absorb any unwanted channels of light.

Re claim 18, Yu discloses the claimed invention according to claim 14, but fails to specify a light dump. Hogg et al. discloses a light dump, which is well known in the art of particle detection by measuring scattered light, to prevent light from the light source from being reflected back into the sensing zone (Col. 6, 25-29). Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify the combination taught by Yu, Pentoney, and Price to include the light dump taught by Hogg et al. in order to absorb any unwanted channels of light.

Allowable Subject Matter

4. Claims 10, 22, and 26-28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 10 recites the limitation that each of the tubes is substantially non-fluorescent.

Claim 22 recites the limitation of a method wherein fluorescence generated at the focal point to a target point comprises reflecting any fluorescence received at the spherical mirror off of the spherical mirror, back to the focal point, and onto the ellipsoid mirror, and reflecting this fluorescence onto the target point.

Claim 26 recites the limitation of a method wherein the fluorescence is filtered before the fluorescence arrives at the target point.

Claim 28 recites the limitation of a method wherein directing the opposing particle flows at the focal point comprises substantially balancing the flows.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Saccomanno (US 6,594,009) discloses a flow cytometer and ultraviolet light disinfecting systems.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marcus H. Taningco whose telephone number is (571) 272-1848. The examiner can normally be reached on M - F 8:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MT



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